Assessment of Poverty and Environmental Degradation Among Rural Communities in Billiri Local Government Area of Gombe State, Nigeria

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ABSTRACT

Poverty and environmental degradation are intertwined challenges that significantly impact communities in Nigeria and across the globe. This study examined poverty and environmental degradation among rural communities in Billiri Local Government area of Gombe state, Nigeria. Random sampling was used to select seven (7) communities in Billiri Local Government area namely; Baganje, Billiri, Kalmai, Tal, Tanglang, Todi, and Tudun Kuka respectively for the study. A sample population size of 360 respondents was used for the study. The socio-demographic characteristics of the respondents indicated that the study area is dominated by male 64% while female were 31%, age group between 25 – 54 (69%) dominates, 78% of the respondents had secondary to tertiary level of education, 60% of the respondents are married, 46% of the respondents were farmers with farming experience of between 6 – 20 plus (49%). The findings revealed that the respondents have good perceptions of poverty, based on five point likert scale eight questionnaire items were used to gauge their perceptions, the perceptions indicated agreed to strongly agree. Similarly, on their perception on environmental degradation the result indicated strongly agreed to all the eight questionnaire items. Perception on land management practices in the area, the result shows that 44% which is the dominant practiced crop rotation, 18% mixed cropping while other practices were insignificant. On the effect of poverty on land management practices, 28% reported limited access to extension services and 27% inadequate fund as the principal issues. 51% assert that soil fertility has greatly reduced and 58% affirmed increase in soil erosion in the communities. The results further, indicates that 26% of the respondents reported lack awareness, 20% lack of enforcement of land management practices and 17% insufficient fund were the principal challenges. The study recommended increased access to information and awareness on poverty and environmental degradation, increased access to financial resources through micro finance programs, afforestation and reforestation particularly planting of fruits and economics trees.

Keywords: Rural poverty, Environmental degradation, Environmental impact, Rural communities, Sustainable development.

INTRODUCTION

Poverty is a global phenomenon, which is a significant cause and effect of global environmental problems. Poverty and environmental degradation are intertwined challenges that significantly impact rural communities across the globe (Ssekibaala & Kasule, 2023). Over the years, numerous studies have been conducted to assess the relationship between poverty and environmental degradation in rural communities (Amoako-Asiedu, 2016; Cheng et al., 2018; Kousar & Shabbir. 2021; Rakshit et al., 2023). Nigeria, as the most populous country in Africa, had an estimated population of 2218, 1181,000 in 2024 (Encyclopedia Britannica, 2024), is not an exception in the

face of significant challenges in poverty reduction and environmental sustainability.

According to the World Bank's data, Nigeria had an estimated 40% of its population living below the poverty line in 2019 (World Bank, 2020). The poverty situation in rural areas is even worse due to limited access to basic services, lack of infrastructure, and a heavy reliance on natural resources for their livelihoods. Simultaneously, environmental degradation has become a critical concern in Nigeria, significantly impacting the lives and well-being of rural communities. Deforestation, soil erosion, biodiversity loss, water pollution, and air pollution are some of the prevalent environmental issues in the country (Agbo, Onyishi, & Ugwu, 2019). These environmental problems have severe consequences for rural communities, as they heavily depend on natural resources for their livelihoods, including agriculture, fishing, and forestry.

Concept of Poverty

Poverty can be defined as a state of deprivation characterized by a lack of basic necessities such as food, shelter, clothing, and access to essential services like healthcare and education. It can also encompass some lack opportunities for economic advancement, social inclusion, and political participation. Poverty is often measured in terms of income levels of households falling below a certain threshold considered to be living in poverty (UNDP, 2021, World Bank, 2020). One commonly used measure of poverty is the poverty line, which is the minimum level of income or consumption needed to meet basic needs. This threshold is often set at the level needed to afford a basic diet, adequate clothing, and shelter. The poverty line can vary between countries and is typically adjusted for differences in cost of living. For example, the poverty line in a high-income country like the United States will be higher than in a low-income country like India (World Bank, 2004).

Poverty is a complex and multifaceted issue that can be influenced by a range of factors, including economic, social, and political circumstances. Poverty affects individuals, families, and entire communities, and often leads to a cycle of disadvantage and deprivation (United Nations Development Programme (UNDP) 2020).Poverty is a multidimensional concept encompassing economic, social, and human aspects. Rural communities in Nigeria are disproportionately affected due to limited access to basic services, income disparities, and lack of sustainable livelihood opportunities (Adejuwon, 2017). Similarly, global studies emphasize the prevalence of rural poverty, with a particular focus on sub-Saharan Africa (Maffioli, et al., 2015). It is crucial to analyze the relationship between poverty and environmental degradation in these communities.

Relationship Between Poverty and Environmental Degradation

Environmental degradation is the deterioration of the environment through the depletion of natural resources, such as air, water, and soil, as well as the destruction of ecosystems. This can arise from various human activities, including pollution, deforestation, over-exploitation of resources, and climate change. Environmental degradation not only impacts the natural world but also has significant social and economic consequences, particularly for vulnerable communities. It can exacerbate poverty by reducing access to essential resources and increasing the prevalence of environmental hazards (UNDP, 2020).

Poverty and environmental degradation are closely linked, and there is a complex relationship between the two. Poverty can

contribute to environmental degradation as people living in poverty may engage in activities that harm the environment out of necessity. For example, they may engage in unsustainable farming practices or rely on natural resources for fuel and shelter, leading to deforestation and soil degradation. Conversely, environmental degradation can also exacerbate poverty by reducing access to natural resources and increasing the risk of natural disasters. For example, deforestation and soil erosion can reduce agricultural productivity, leading to food insecurity and loss of livelihoods. Additionally, pollution and environmental hazards can have adverse effects on human health, leading to increased healthcare costs and lost productivity. (World Bank, 2004)

Addressing both poverty and environmental degradation requires a multi-faceted approach that considers the connections between the two. This can include policies and interventions that promote sustainable development, improve access to basic services, and reduce environmental harm. For example, initiatives that support sustainable agriculture, promote renewable energy, and provide access to clean water and sanitation can help to address both poverty and environmental degradation (World Bank2004).

According to Nweze (2017), poverty and environmental degradation are intricately linked in Nigeria, creating a need for further research to ascertain the extent and drivers of environmental degradation in rural areas. Similarly, Afolabi (2015) emphasizes the simultaneous addressing of poverty and environmental degradation for sustainable development in rural Nigeria. Moreover, Olawande, Adejumo and Ogunniyi, (2019) stress the importance of conducting research on poverty and rural environmental degradation, particularly in specific regions like Billiri LGA, Gombe State, to fill existing knowledge gaps. The Gombe State Economic Empowerment and Poverty Reduction Strategy II (GSEPRS) serves as a relevant policy reference for understanding the context in which the assessment of poverty and environmental degradation(Gombe State Government, 2018).

Environmental degradation refers to the deterioration of natural resources and ecosystems caused by human activities. Rural communities often rely heavily on natural resources for their livelihoods, making them vulnerable to environmental degradation. Studies show that activities such as unsustainable farming practices, deforestation, and pollution contribute to the degradation of land, water, and air in rural areas (May, Sheldon, & Soluri, 2016). These degradation processes further exacerbate poverty and hinder sustainable development efforts.

Several interrelated factors contribute to poverty and environmental degradation in rural communities. Studies suggest that limited access to productive assets, inadequate infrastructure, population growth, and unsustainable resource use play significant roles (Okuneye, 2018). Additionally, external forces such as global trade policies and climate change impact rural communities, further perpetuating poverty and environmental degradation (Schmidt-Traub et al., 2019).

The Consequences of Poverty and Environmental Degradation

The consequences of poverty and environmental degradation in rural communities are far-reaching. In Nigeria, these include food insecurity, increased vulnerability to climate change, health issues, and social dislocation (Oluwole & Adewumi, 2018). Globally, similar consequences are observed, but with varying degrees of severity depending on contextual factors.

Various interventions and approaches have been proposed to address the intertwined challenges of poverty and environmental degradation in rural communities. Sustainable agricultural practices, community-based natural resource management, renewable energy projects, and poverty alleviation programs are among the strategies implemented at both local and global levels (Mekonnen, Kohlin, Tedla, 2017). However, the effectiveness of these interventions varies and requires context-specific adaptation.

Therefore, the assessment of poverty and environmental degradation among rural communities is a significant concern in regions such as Billiri Local Government Area Gombe State, Nigeria. This study aims to investigate the relationship between poverty and environmental degradation among rural farmers in Billiri Local Government Area of Gombe State, Nigeria. Specifically, this study sought to explore the extent to which poverty levels contributes to environmental degradation in the agricultural practices of rural farmers, and assess the impact of environmental degradation on socioeconomic well-being of communities in the region. By addressing this research problem, the study aims to provide valuable insights into the interplay between poverty and environmental degradation in rural settings, with the goal of informing policy interventions and sustainable development of strategies to improve the livelihood of rural farmers in Billiri LGA, Gombe State, Nigeria.

MATERIALS AND METHODS

Study Area

Billiri is one of the 11 Local Government Areas of Gombe State, Nigeria. It lies about 45 km south of Gombe and located between latitude 9° 51.5' 30''N to 9° 51' 31.79''N, and longitude 11° 13.3' 10'';E to 11° 13' 18.60''E it has a landmass of about 737 Km^2 and a projected population of 413,435 people in 2023. It is bounded to the north by Akko Local Government Area, to the south and east by Shongom Local Government Area and to the north-east by Kaltungo Local Government Area (Fig. 1). Billiri is made up of the following wards and communities: Tangale, Ayaba, Banganje, Bare, Billiri, Kalmai, Kulkul, Laberpit, Lakalkal, Lamugu, Landongor, Laushi Daji, Pade Kungu. The administrative headquarters is located in the town of Billiri (Gombe State Government, 2018).

Sampling Techniques

Sampling frame

Based on accessibility and spatial coverage seven out of the eleven wards in the study area were randomly selected to form the sample frame. This includes Baganje, Billiri, Tal, Todi, Tudun Kwaya, Kalmai and Tanglang respectively (Figure 1).

Sample size

Five (5) percent of the population of each selected community in the study area was taken to form the sample size for the study, as indicated in Table 1 below. Simple random sampling was employed to select the study respondents across all the sampled communities.

Based on the projected population of Billiri Local Government Area for 2023 (413,435 people), Sampling table provided by Cohen, Manion and Morrison (2007), were used to determine the sample size, confidence levels and confidence interval. Using this method the sample was determined to be 384. This guided the number of questionnaires that were administered for the purpose of the research. However, only 360 questionnaires were properly completed and returned. Simple random sampling technique was adopted in the

sampling of respondents in the selected communities in the study area.

The research instrument (questionnaire) used was divided into four sections A, B, C and D. where section A focused on the demographic and socio-economic profile of the respondents, Section B focused on poverty level among rural households, Section C talks about Environmental degradation, and Section D on Land management practices adoption among rural households respectively.
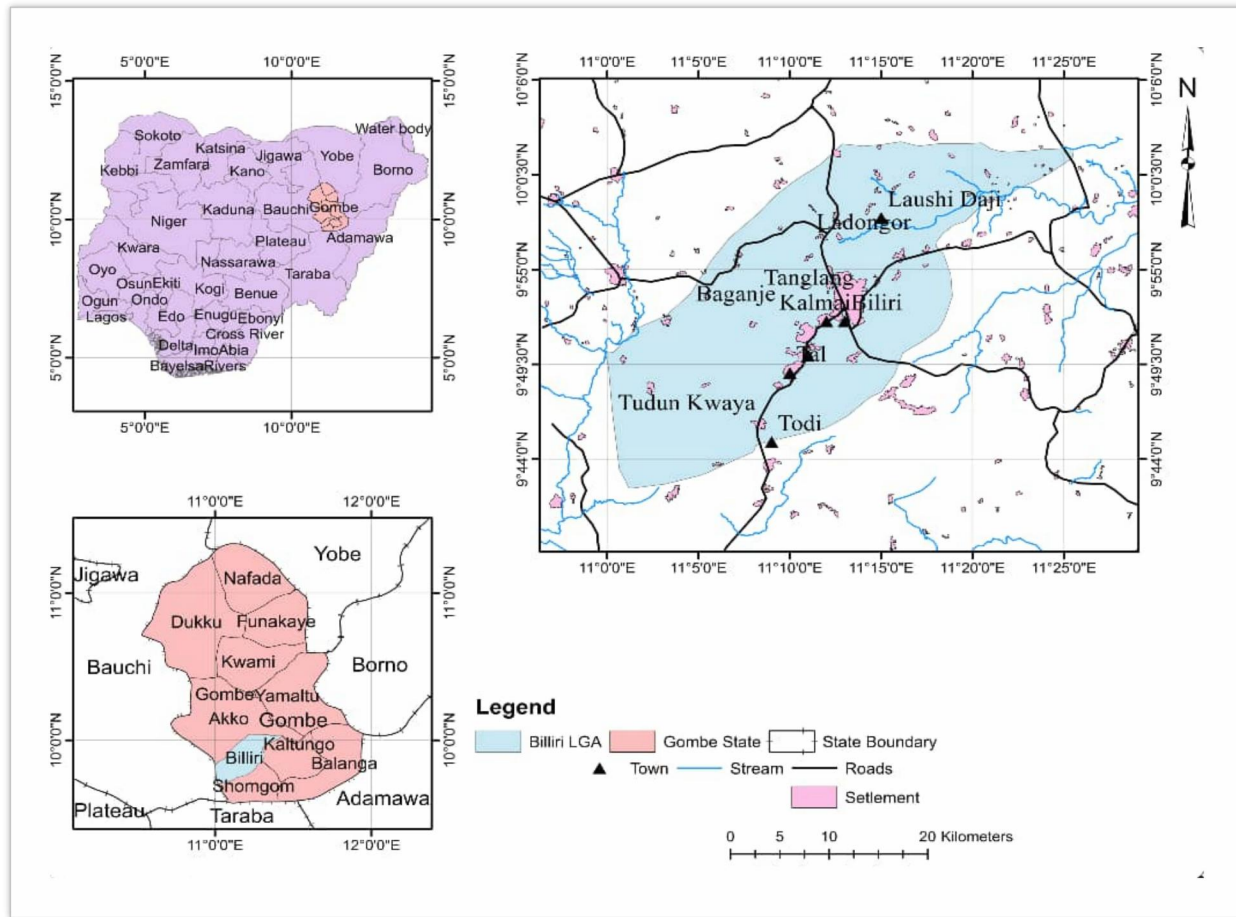

Figure 1: Map of the study area Billiri Local Government Area

Table 1: Selected communities and sample Population of the Study.

Communities	2023 Projected population	Sample population
Billiri	165,071	153
Tal	73,839	69
Tudun Kwaya	43,785	41
Todi	25,616	24
Tanglang	24,766	23
Baganje	49,812	46
Kalmai	30,546	28
TOTAL	**413,435**	**383**

Source: Field survey, (2024).

Descriptive statistics was used to summarize and presents demographic and socioeconomic data, perception on land management and challenges of adopting land management practices collected. While, the 5- point Likert scale was adopted for the analysis of data on poverty level among rural household and awareness of environmental degradation in the study area. The items structured using five (5) point rating scale thus; strongly agreed SA=5, agreed A=4, undecided UD=3, disagreed D=2, strongly disagreed SD=1. Therefore, decision is made based on the item that had the highest percentage score.

RESULTS AND DISCUSSION

Demographic and Socioeconomic Background of Respondents

Table 2, provides the demographic and socioeconomic characteristics of the respondents in the study area which includes; sex, marital status, age group, main occupation, income levels, years of farming experience, duration of stay community and educational status respectively.

Table 2: Demographic and Socio-economic characteristics of respondents in the study area n=360.

Variables	Response	Percentage (%)
Sex		
Male	231	64
Female	129	36
Marital Status		
Single	120	33
Married	215	60
Divorced	10	3
Widowed	15	4
Age group		
18 – 24	50	14
25 – 34	145	40
35 – 44	105	29
45 – 54	40	11
55 – 64	10	3
65+	10	3
Educational status		
Arabic education	19	5
Adult education	40	11
Primary level	21	6
Secondary level	80	22
Tertiary level	200	56
Main occupation		
Civil servants	86	24
Farmers	166	46
Traders/Business	72	20
Blacksmith/Carpenter	36	10
Income levels		
Very high	14	4
High	36	10
Medium	119	33
Low	112	31
Very low	79	22
Years of Farming experience		
1 – 5	185	51
6 – 10	100	28
11 – 15	40	11
16 – 20	15	4
20+	20	6
Duration of stay in community		
1 -10	262	73
11 – 20	65	18
21 – 30	22	6
31+	11	3

Source: Field survey, (2024).

The result in Table 2 shows the sex distributions of respondents, with 64% of the respondents are male while 36% are female. This implies that study was dominated by the male who more readily available for such interaction.

From Table 2, it shows that 33% of the respondents are single, 60% are married, 3% of them are divorced and 4% respondents are widows/widowers. The results reveals that majority of the respondents are married and hence responsible for their family up keep.

The result in Table 2 shows the age distribution of the respondents. It indicates that (14%) of the respondents are between the age group (18-24), 40% between the age group (25-34), 29% between age group (35-44), 11% between age (45-54), 3% respondents are from

age (55-64) and 3% of them were between the age group 65 and above. This result shows that majority of the population are between age 25-34 which constitute the youth who are full of energy and can be fully engaged in agricultural production in the study area. Hence, might have attended certain level of education which gives them more understanding to respond to the research questionnaire.

In Table 2, the result of this analysis shows the educational status of the respondents, with 5% of them attended Arabic/Islamic school, 11% of them passed through adult education, 6% of the respondents attained only primary school, 22% respondents had secondary school and 56% of the respondents had tertiary school educational qualification. The finding shows that majority of the respondents have obtained tertiary education and therefore have high tendency of making a good decision concerning degradation and poverty in their respective communities.

From Table 2, 24% of the respondents are civil servants, 46% are farmers, 20% are traders and business, and 10% are blacksmith and carpentry respectively. From the result it's evident that most of the respondents are farmers who have better understanding of what the questionnaire is demanding with regards to environmental degradation and poverty.

Income status, Table 2 shows that 4% of the respondents have a very high income status, 10% high income status, 33% medium income status, 31% low income status and 22% reported that they have very low income status respectively. This reveals that most the respondents are within low to medium income status in the study area.

Years of experience in farming, Table, shows that majority of the respondents 51% of the respondents had (1–5) years of experience, 28% had (6-10) years' experience, had (11–15) years' experience, 4% had (16–20) year experience and 6% had 21 years and above of experience in farming in their communities respectively. Majority of the respondents are young people between 25-34 years of age which formed the working force full energy.

Duration of stay in the rural communities, Table 2, indicates that 91 % which formed the majority of the respondents had being in the rural communities for between 1–20 years, while 9% of them stay for more than 30 years in the communities.

Perceptions on Poverty among Rural Household

Table 3: Perception on Poverty among households in communities in the study area n= 360.

Perception on poverty	SD (%)	A (%)	UD (%)	D (%)	SD (%)	Remark
Poverty is the state of one who lacks a usual or socially acceptable amount of money or material possessions.	238(66)	79(22)	28(8)	7(2)	7(2)	Strongly agreed
Poverty exists when people lack the means to satisfy their basic needs.	112(31)	198(55)	40(11)	3(1)	7(2)	Agreed
Absolute poverty is based on a defined minimum standard i.e. one is unable to meet basic need (food, clean water and safe housing) due to lack of resources.	187(52)	112(31)	43(12)	11(3)	7(2)	Strongly agreed
Relative poverty is based on the level of living in the culture or community in which a person lives.	83(23)	155(46)	65(18)	33(9)	14(4)	Agreed
Causes of poverty include; Inequalities in income distribution, access to productive resources, basic social services, opportunities and more.	162(45)	112(31)	51(14)	7(2)	7(2)	Strongly agreed
Poverty implies lack of access to clean water and	158(44)	137(38)	51(14)	7(2)	7(2)	Strongly

nutritious food, lack of access to basic healthcare, inequality and injustice, conflict and instability, lack of access to jobs and livelihood, poor basic infrastructure and climate change.						agreed
There is a link between poverty and environmental degradation.	158(44)	126(35)	54(15)	11(3)	11(3)	Strongly agreed
Poverty is higher among rural households.	155(43)	130 (36)	43(12)	18(5)	14(4)	Strongly agreed

Source: Field survey, (2024).

Table 3, presents the perception on poverty in the rural communities. It reveals that 66 % of the respondents strongly agreed that absolute poverty is based on a defined minimum standard i.e. one is unable to meet basic needs (food, clean water, safe housing) due to resources.

This result concur with the definition of United Nations Development Programme (UNDP) (2020), which states that; poverty refers to the lack of basic human needs, such as clean water, nutrition, health care, education, clothing, and shelter. It can be measured in terms of income, access to resources, and standard of living. Poverty is a complex and multifaceted issue that can be influenced by a range of factors, including economic, social, and political circumstances. Poverty affects individuals, families, and entire communities, and often leads to a cycle of disadvantage and deprivation. 55% of the respondents agreed that poverty exists when people lack the means to satisfy their basic needs. From Table 3, 52% strongly believed that absolute poverty is based on a defined minimum standard i.e. one is unable to meet basic need (food, clean water and safe housing) due to lack of resources. 46 % of respondents agreed that relative poverty is based on the level of living in the culture or community in which a person lives see Table 3.

From Table 3 it shows that 45% of the respondents strongly agreed that inequality in income distribution and access to productive resource, basic social services, opportunities and more are causes of poverty. 44% of respondents from Table 4, believed strongly agreed that lack of and nutritious food, lack of access to basic healthcare inequality and injustice, conflict and instability, lack of access to job and livelihood, poor basic infrastructure and climate change are factors of poverty.

From Table 3, it indicates that 44% of the respondents strongly agreed that there is a link between poverty and environmental degradation, 35% agreed while 3% disagreed with that. This result agrees with the finding of Nweze (2017) who argues that poverty and environmental degradation are intricately linked in Nigeria, creating a need for further research to ascertain the extent and drivers of environmental degradation in rural areas.

The result in the Table 3 shows that 43% of the respondents strongly agreed that poverty is high among rural household, 36% agreed with that while 4% strongly disagreed. Poverty is a multidimensional concept encompassing economic, social, and human aspects. This result agrees with the findings of Adejuwon, (2017) who find that rural communities in Nigeria are disproportionately affected due to limited access to basic services, income disparities, and lack of sustainable livelihood opportunities. Similarly, global studies emphasize the prevalence of rural poverty, with a particular focus on sub-Saharan Africa (Maffioli,Onofa, Poriguez & Stucchi, 2015).

Environmental Degradation

Environmental degradation is the deterioration of natural resources and ecosystems caused by

human activities. Rural communities often rely heavily on natural resources for their livelihoods, making them vulnerable to environmental degradation. Table 4 present perceptions on environmental degradation among rural communities in the study area. The respondents unanimously strongly agreed on their perceptions on environmental degradation.

Table 4: Perceptions on Environmental Degradation among rural communities n=360.

Perception on Environmental degradation	SD (%)	A (%)	UD (%)	D (%)	SD (%)	Remark
Deforestation, overgrazing, pollution and climate change all contributes to environmental degradation and to poverty.	212(59)	105(29)	18(5)	11(3)	14(4)	Strongly agreed
Environmental degradation can be reduced if we; reduce, reuse and recycle in our local communities.	169(47)	105(29)	47(13)	25(7)	14(4)	Strongly agreed
Volunteer for cleanups in our rural communities.	202(56)	72(20)	47(13)	25(7)	14(4)	Strongly agreed
Cut down on what you throw away and shop wisely.	180(50)	118(33)	40(11)	11(3)	11(3)	Strongly agreed
Involved in tree planting campaign in our rural communities	187(52)	101(28)	43(12)	22(6)	7(2)	Strongly agreed
Practice soil and water conservation practices on our farmlands.	180(50)	108(30)	50(14)	18(5)	4(1)	Strongly agreed
Create awareness through environmental education on environmental degradation in our rural communities.	173(48)	97(27)	47(13)	25(7)	18(5)	Strongly agreed
Soil erosion is threatening farmlands in rural communities and affecting crop yield.	198(55)	90(25)	43(12)	11(3)	18(5)	Strongly agreed

Source: Field survey, (2024).

Deforestation, overgrazing, pollution and climate change all contributes to environmental degradation and to poverty: The result in Table 4 shows that majority (59%) of the respondents strongly agreed that deforestation, overgrazing, pollution, and climate change all contributes to environmental degradation and to poverty. This result agrees with the study of May, Sheldon, and Soluri, (2016), who founds that activities such as unsustainable farming practices, deforestation, and pollution contribute to the degradation of land, water, and air in rural areas. These degradation processes further exacerbate poverty and hinder sustainable development efforts. And also agrees with Abdullahi, Muhammed and Sani (2019), who reported that poverty exacerbates environmental degradation through unsustainable land use practices and natural resource depletion.

Environmental degradation can be reduced if we; reduce, reuse and recycle in our local communities: This result shows that majority (47%) of the respondents strongly agreed that tree planting campaign should be initiated in the study area. This result shows that majority of the respondents knows and understands why it is important to have a safe and un-degraded environment. Volunteer for cleanups in our rural communities: from the result it's clear that 56% the majority strongly believes that participation of community members willingly to cleanup i.e. environmental sanitation can contribute greatly in improving the environment. Cut down on what you throw away and shop wisely: the result indicates that 50% majority of the respondent affirmed the need to cut down on what we throw away and

shop wisely will greatly help reduce the poverty and environmental degradation in rural communities, particularly, now that the economy is very hard and biting strongly.

Involved in tree planting campaign in our rural communities: from the result it's clear that majority 52% of the respondent strongly agreed that the communities need to be more involved in tree planting campaign particularly planting of ornamental plants, fruits trees, vegetables plants, herbs, and economic plants particularly early yielding varieties. Community and individual gardens will help household income generation, healthy diet, reduced poverty and environmental degradation.

Practice soil and water conservation practices on our farmlands: This result shows that 50% of the respondents strongly agreed that soil conservation management should be practiced to avoid poor crop yield. Olayinka et al., (2017), assert that the effectiveness of specific soil and water conservation practices in mitigating soil degradation and enhancing agricultural sustainability needs to be further investigated, considering the diverse soil types, climate conditions, and cultural contexts found

Perception of Land Management Practices

The figure 2 shows that 18% respondent practice mixed cropping in their community, 44% of the respondents practice crop rotation, 4% respondents practice land tenure system, 13% tree planting as their land management practice, 3% respondents practice zoning regulation, 8% practice terracing, 9% practice grazing, 2% respondents practice shifting cultivation and 4% practiced mulching as a method of managing their land. From this analysis it is clear that majority of the respondents in Billiri communities adopt crop rotation as the major land management practice followed by mix cropping and tree planting.

across Nigeria. Create awareness through environmental education on environmental degradation in our rural communities: The findings from the result shows that majority (56%) of the respondents strongly agreed that awareness should be created through environmental education on relationship between environmental degradation and poverty in the rural communities.

Soil erosion is threatening farmlands in rural communities and affecting crop yield: 55% majority of the respondents strongly agreed that soil erosion is threatening farmlands in the rural communities. Land degradation is a global issue that affects agricultural production and the livelihoods of millions of people. Musa et al., (2023), reported that more than half the total people of Billiri Local Government Area are involved in agriculture directly or indirectly. However, the agricultural land is decreasing in value and productivity day by day. People might not be aware of the consequences of improper uses of agricultural land which engenders land degradation. There is all-important need to create more awareness on the effects of land degradation as a measure towards curbing the menace.
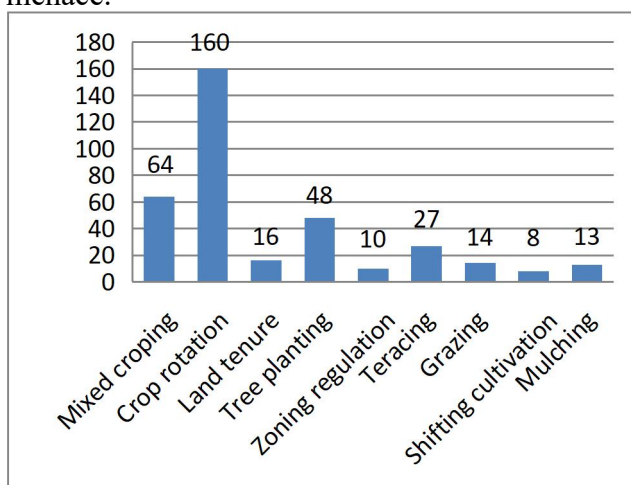

Figure 2: Perception of Land Management Practices.

Source: Author's Field work 2024

The result in Table 5 shows that 21% respondents are of the opinion that inadequate facilities and support from micro funding organizations affects their choice of land management practice, 28% respondents which are the majority said that limited access to extension services affect their choice, 27% respondents said inadequate fund from the government is the cause while 24% people opt that it is lack of awareness of the right choice to make. The rural household needs to be provided with information and new ideas that have been developed by agricultural research stations and also supply them with necessary equipment and services.

Table 5: Effect of Poverty on Land Management Practice in the study area n=360.

Effect of poverty	No of respondents	Percentage (%)
Inadequate facilities and support organizations	76	21
Limited access to extension services	102	28
Inadequate fund from the government	97	27
Lack of awareness	85	24

Source: Author's field work 2024

The result from Figure 3 shows the changes in soil fertility on respondents' farmlands in Billiri communities. The finding shows that 51% of the respondents a decrease in their soil fertility, and very few; 27% observed an increase in the fertility of the soil in their farmlands and 22% opines that there were no change in soil fertility status. This means that majority of the respondents have observed a huge decrease in the fertility of the soil in their farmlands, which calls for serious attention on the issue of land management with the help of agricultural extension service managers and educators to create awareness where necessary.
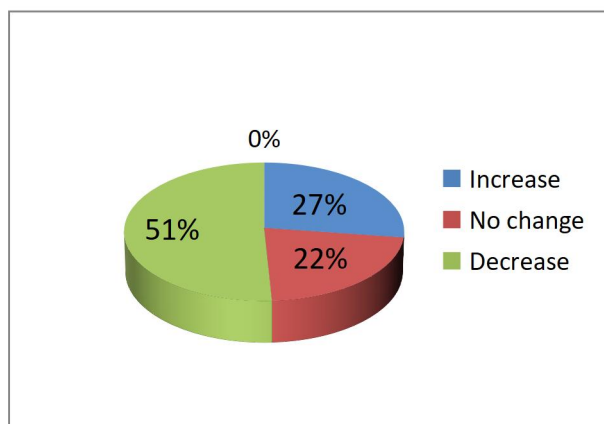
Source: Author's Field work, (2024).

The result in Figure 4 reveals that 58% of the respondents are experiencing erosion and degradation on their farmlands, 19% have observed no change, and only few 23% have observed increase in healthy condition of their farmlands. This result shows that majority of the respondents' farmlands are suffering from erosion and degradation which needs a serious and urgent intervention.
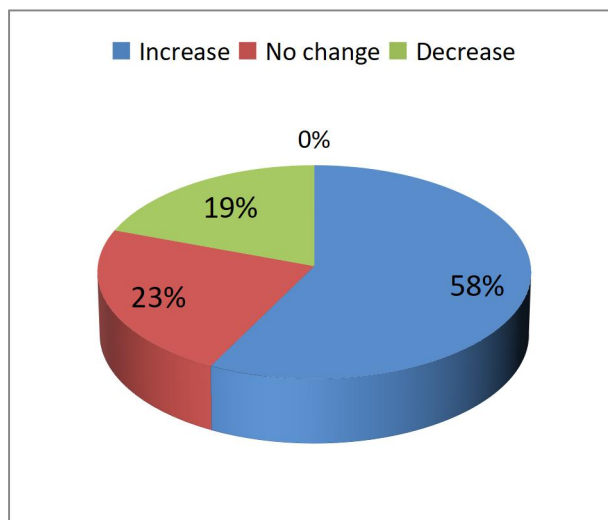

Figure 3: Changes in soil fertility on Farmlands.

Figure 4: Soil Erosion and Degradation on Farmlands.

Source: Author's fieldwork (2024).

Challenges towards Adopting Land Management Practices among Rural households

The result from the Table 6 shows that 7% respondents said the challenges they are facing in adopting land management practice is climate change, 20% of them said the challenges they are facing is lack of enforcement of land management regulations, 11% people said the challenge they are facing is high cost of living, 6% respondents are facing problem of insufficient government support, 17% said they are facing challenge of insufficient fund and 26% majority of the respondents affirmed the challenge is lack of awareness. 8% respondents said the challenge they face is overgrazing and deforestation and 5% people are of the opinion that cultural norms and tradition seems to be their challenge in adopting land management practice.

Table 6: Challenge of adopting land management practices n=360.

Challenges	Frequency	Percentage (%)
Climate change and environmental degradation	26	7
Lack of enforcement of land management regulations	73	20
High cost of living	39	11
Insufficient government support	21	6
Insufficient fund	63	17
Lack of awareness	92	26
Over grazing and deforestation	27	8
Cultural norm and traditions	18	5

Source: Author's Field work, (2024).

From Table 7, 2% respondents suggested that working with community leaders and engaging local community in decision making process is a way of overcoming the challenges of land management adoption, 17% of the respondents said having access to financial sources will greatly solve the present challenges, 12% respondents are of the opinion that afforestation is the way forward, 7% respondents suggested soil management conservation, 13% people said that government intervention will help overcome the challenges, 12% people are of the opinion that land management regulations should be enforced for better management of land. Majority of the respondents; 37% people suggested that proper information and awareness is the solution to the challenges they are currently facing in their various communities. There is therefore the need for more enlightenment campaign in the rural communities.

Table 7: Ways of Overcoming challenges of land management adaptation n=360.

Ways of overcoming challenges	Frequency	Percentage (%)
Working with community leaders and engaging the local community in decision making process	9	2
Access to financial resources through micro funding programs	60	17
Afforestation programmes	44	12
Soil and water conservation management	24	7
Government intervention programs	49	13
Enforcement of land management regulations	42	12
Access to information/Creating awareness	132	37

Source: Field survey, (2024).

CONCLUSION

The study concludes that there is a strong correlation between poverty and environmental degradation in rural communities i.e., implies that an increase in poverty leads to an increase in environmental degradation in Billiri LGA. The lack of economic opportunities and basic infrastructure in these communities contributes to the exploitation and degradation of natural resources, further exacerbating the cycle of poverty. Addressing these interconnected issues requires a holistic approach that focuses on sustainable development, poverty alleviation, and environmental conservation.

Based on the findings, the following recommendations are proposed;

i. The Government and Non-governmental organizations should do more in implementing poverty alleviation programs that focus on improving livelihood opportunities for rural communities, including skills training, access to credit, and support for small-scale enterprises.

ii. Promote sustainable agricultural practices and land management practices to mitigate environmental degradation, including afforestation and reforestation programs, soil and water conservation measures, and waste management initiatives by both the government and NGOs.

iii. Both the government and NGOs should strengthen the enforcement of environmental regulations to prevent further degradation of natural resources, including the establishment of community-based conservation initiatives and environmental education programs create more awareness.

iv. Government should do more to re-activate extension services in the rural communities and enhance the overall well-being of the population and reduce the reliance on natural resource exploitation for survival.

Conduct further research and data collection to monitor the progress of poverty reduction and environmental conservation efforts in Billiri LGA, in order to inform evidence-based policies and interventions.

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